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DATE OVERRIDE

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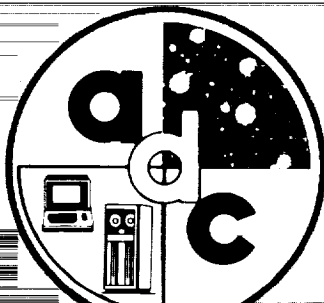
839

National Space Science Data Center/
World Data Center A For Rockets and Satellites

SECOND CATALOG OF INTERFEROMETRIC MEASUREMENTS OF BINARY STARS

(McAlister and Hartkopf 1988)

Documentation for the Machine-Readable Version



June 1989

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(MCALISTER AND HARTKOPF 1988): DOCUMENTATION
FOR THE MACHINE-READABLE VERSION (NASA)

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***SECOND CATALOG OF INTERFEROMETRIC
MEASUREMENTS OF BINARY STARS***

(McAlister and Hartkopf 1988)

Documentation for the Machine-Readable Version

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June 1989

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Abstract

The machine-readable version of the catalog, as it is currently being distributed from the Astronomical Data Center, is described. The catalog is a compilation of measurements of binary- and multiple-star systems obtained by speckle interferometric techniques; this version supersedes a previous edition of the catalog published in 1985. Stars that have been examined for multiplicity with negative results are included, in which case upper limits for the separations are given. The second version is expanded from the first in that a file of newly resolved systems and six cross-index files of alternate designations are included. The data file contains alternate identifications for the observed systems, epochs of observation, reported errors in position angles and separations, and bibliographical references.

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Abstract iii

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1.0 Introduction

1.1 Description

The *Second Catalog of Interferometric Measurements of Binary Stars* (McAlister and Hartkopf 1988) is an updated and expanded version of the first edition of the catalog (McAlister and Hartkopf 1985). It contains all measurements (known to the compilers) of binary- and multiple-star systems obtained by speckle interferometric techniques and in print or in press before October 1988. In addition to actual separation and position-angle measurements, the compilers include stars that have been examined for multiplicity with negative results, in which case upper limits for separation are given if they were included in a publication.

Although the primary data of the catalog are observed separations and position angles, their errors, epochs of measurement, and bibliographical references, ancillary data such as alternate identifications, notes, a list of systems first resolved by interferometry, and a set of cross-index files arranged by various major catalog designations, are included. The main data file uses designations from the *Washington Catalog of Visual Double Stars* that is maintained at the U. S. Naval Observatory by Charles E. Worley.

This document describes the machine-readable version of the *Second Catalog of Interferometric Measurements of Binary Stars* as it is currently being distributed from the Astronomical Data Center (ADC). It is intended to enable users to read and process the computerized catalog without problems and guesswork and it should be used only to supplement the information contained in the published catalog and the introduction to the machine version. Since there are several important formatting differences between the published and machine-readable tables, users of the machine version are encouraged to carefully study the data descriptions in the following sections of this document before using and interpreting the data. A copy of this document should be transmitted to any recipient of the machine-readable catalog originating from the ADC.

1.2 Source Reference

McAlister, H. A. and Hartkopf, W. I. 1988, *Second Catalog of Interferometric Measurements of Binary Stars*, Version 1988 October (see Center for High Angular Resolution Astronomy, Georgia State University, *CHARA Contribution No. 2*).



2.0 Structure

2.1 File Summary

The machine version of the *Second Catalog of Interferometric Measurements of Binary Stars* consists of 11 files. Table 1 gives the machine-independent file attributes. All logical records are of fixed length, and, if the catalog is received on magnetic tape, it will contain blocks of fixed length (as noted below), except that the last block of each file may be short. The second file contains the basic data of the catalog, while succeeding ones contain textual information and cross-index tables to facilitate the use of the catalog data. The data file is in a multiple-record format per object in order to allow all known observations of a star to be reported. However, all records are uniform in that they contain the same ancillary information and differ only by the primary data of multiple observations. Thus, the records can be sorted fully by any of the data fields.

<i>Second Catalog of Interferometric Measurements of Binary Stars</i> (McAlister and Hartkopf 1988)				
File	Contents	Record Format	Logical Record Length	Total Number of Logical Records
1	Introduction	FB	80	222
2	Data	FB	98	12326
3	Newly Resolved	FB	105	290
4	Notes	FB	80	968
5	Bibliography	FB	80	119
6	HR-HD-WDS	FB	22	1778
7	DM-HD-WDS	FB	33	3152
8	SAO-HD-WDS	FB	26	3076
9	ADS-HD-WDS	FB	25	1191
10	Const-HD-WDS	FB	33	876
11	Disc-HD-WDS	FB	33	1710

Table 1. Summary Description of Catalog Files: FB = Fixed length blocks (last may be short)

The information contained in the above table is sufficient for a user to describe the indigenous characteristics of the machine-readable version of the *Second Catalog of Interferometric Measurements of Binary Stars* to a computer. Information easily varied from installation to installation, such as block size (physical record length), blocking factor (number of logical records per physical record), total number of blocks, density, number of tracks, and character coding (ASCII, EBCDIC) for tapes is not included, but should always accompany secondary copies if any are supplied to other users or installations.

2.2 Introduction (File 1 of 11)

This file is composed of straight text and contains the introduction to the published catalog. Statistics of the catalog and a basic description of the data are given, but neither column-by-column nor byte-by-byte descriptions of the various tables are included in the authors' introduction; thus, they are given in this document.

Byte(s)	Fortran Format	Data
1-80	A80	Mixed case text

Table 2. Introductory File Record Format

2.3 Catalog (File 2 of 11)

This file contains the compilation of observational data for the double and multiple systems included in the catalog.

As mentioned in "File Summary" on page 3, the data file may contain more than one logical record per object if multiple values of reported data exist. When a particular observation produced a negative result (undetected duplicity), only an upper limit is reported. In these cases, the position angle (PA) field is blank. These cases can always be detected by looking for an upper limit character (<) before the separation. It is important to do this if the PA field is being read with a real format specification, since it is possible for a measured PA to be zero.

Table 3 gives a byte-by-byte description of the contents of the data file. A suggested Fortran format specification for reading each data field is included and can be modified depending upon individual programming and processing requirements (Fortran 77 character string-type formats are used); however, caution is advised when substituting format specifications, since many data fields contain character data and others are blank when data are absent. As mentioned above, particular care is required for the PA field, where valid zero values can exist, but where fields are blank for nonexistent data. It is safest to buffer in records in an unformatted mode or read them with character (A) formats and test for blank data fields before processing with numerical formats for calculations and/or searching purposes. For such fields, primary numerical format specifications are given to indicate decimal-point locations, while alternate A-type formats are specified in parentheses. Default (null) values are always blanks in data fields for which primary suggested formats are given as A. Also note that extra spaces have been left in certain fields to allow for increased measurement accuracy (and thus greater precision) in future editions of the catalog.

Byte(s)	Units	Suggested Format	Default Value	Data
1-10	---	A10	---	WDS designation
11-12	---	2X	---	Blank
13-26	---	A14	---	Alternate identifier
27	---	1X	---	Blank
28-41	---	A14	---	Alternate identifier
42	---	1X	---	Blank
43-48	---	I6 (A6)	blank	HD number
49-51	---	A3	---	HD suffix
52	---	1X	---	Blank
53-61	years	F9.4	---	Epoch of observation
62-64	---	3X	---	Blank
65-69	°	F5.1 (A5)	blank	Position angle (PA)
70	---	1X	---	Blank
71	---	A1	---	PA uncertainty flag (:)
72	---	A1	---	Lower limit character (>) for PA error
73-75	°	F3.1 (A3)	blank	Error in PA
76-78	---	3X	---	Blank
79	---	A1	---	Upper limit character (<) for separation
80-84	'	F5.3	---	Separation
85	---	1X	---	Blank
86	---	A1	---	Separation uncertainty flag (: or ?)
87	---	A1	---	Lower limit character (>) for separation error
88-92	'	F5.3 (A5)	blank	Error in separation
93-94	---	2X	---	Blank
95-97	---	A3	---	Bibliographical code
98	---	1X	---	Blank

Table 3. Data File Record Format

WDS designation	System designation in the <i>Washington Catalog of Visual Double Stars</i> of C. E. Worley.
Alternate identifier	Identifier in a major catalog (HR, DM, ADS).
Alternate identifier	Identifier in a secondary catalog or list, or star name in some cases.
HD number	Numerical designation in <i>The Henry Draper Catalogue</i> (Cannon and Pickering 1918-24) or in one of the HD extensions (Cannon 1924-36, Cannon and Walton Mayall 1949).
HD suffix	The inclusion of a second HD star in the system is indicated by a hyphen followed by the last digit of the adjacent HD star.
Epoch of observation	The reported epoch varies in precision depending upon the accuracy to which it was reported; thus, bytes following the decimal point may be blank.
Position angle	The reported position angle of the components (measured in the normal way, north through east) at the epoch of observation. Note that precision can vary (byte 69 may be blank).
PA uncertainty code	A colon (:) denotes an uncertain value.
Lower limit character (PA error)	The character ">" is present if the PA error following was reported as a lower limit.
Error in PA	The error is generally given to one decimal place, but the precision varies (byte 75 can be blank).

Upper limit character (sep)	The character "<" is present if the angular separation following was reported as an upper limit, <i>i.e.</i> , a negative result above a reported threshold was given in the reference cited.
Separation	The reported angular separation between the components at the epoch of observation, or an upper limit to the separation. The precision can vary, with lower accuracy indicated by trailing blanks in the field.
Separation uncertainty flag	The following codes are used: : The observation is uncertain. ? The observation is questionable (very uncertain).
Lower limit character (sep error)	The character ">" is present if the separation error following was reported as a lower limit.
Error in separation	The error is generally given to three decimal places, but the precision can vary (trailing bytes blank).
Bibliographical code	A two- or three-character identification code for the reference cited in the bibliography file (5).

2.4 Newly Resolved Systems (File 3 of 11)

This file contains a listing of 280 newly resolved binaries. The content of the table is described in Section III (last paragraph) of the introductory file and need not be repeated here. Although the table is reasonably uniform in format, it has the nature of a free text file (with table captions and column headings) and, therefore, will not be described in detail in this document. Rather, a brief column description is given below to alert the user as to the contents of the table, since such a description is not given in the Introduction.

Column	Information Content
1	Discovery designation or bibliographical reference code.
2	<i>Bright Star Catalogue</i> (Hoffleit 1982) or DM number.
3	Name of star or binary system.
4	HD number.
5	SAO (SAO Staff 1966) number.
6	ADS (Aitken 1932) number.
7	Right ascension and declination (2000) (equivalent to WDS designation).
8	Visual magnitude.
9	Spectral classification.
10	Discovery separation (seconds of arc).
11	Binary type.

Table 4. Contents of Newly Resolved Systems File

2.5 Notes (File 4 of 11)

This file contains miscellaneous notes and additional information for the systems included in the catalog. Not all systems have corresponding notes, but no flags are included in the data file for those that do, so users should check for notes on all systems in which they are interested. This file also has a free text structure precluding a byte-by-byte description. The first record of a note group for a system contains the WDS designation in bytes 1-10, followed by an alternate designation

(name). Records for individual observations contain the reference epoch in bytes 6-14 and text in bytes 17-80. A general note is indicated by hyphens in bytes 6-14. Blank records separate system groups.

2.6 Bibliography (File 5 of 11)

This file contains the references cited by the codes in bytes 95-97 of the data file. Although the file contains a table caption and blank records, the format is uniform enough to be described in the following table. Columns not described are blank and continuation lines are indicated by blanks in bytes 1-7.

Byte(s)	Fortran Format	Data
2-4	A3	Reference code
6	A1	An equal (=) sign
8-80	A73	Reference in free text (upper and lower case) form

Table 5. Bibliography File Record Format

2.7 HR-HD-WDS Cross Index (File 6 of 11)

This file contains a cross index for designations in *The Bright Star Catalogue* (Hoffleit 1982), *The Henry Draper Catalogue* (Cannon and Pickering 1918-24, Cannon 1924-36, Cannon and Walton Mayall 1949), and the WDS. The file is ordered by HR = BS number and is uniform in format, as described in the following table.

Byte(s)	Fortran Format	Data
1-4	I4	HR = BS number
5	1X	Blank
6-11	I6	HD number
12	1X	Blank
13-22	A10	WDS designation

Table 6. HR-HD-WDS Cross Index Format

2.8 DM-HD-WDS Cross Index (File 7 of 11)

The file is a cross index of identifications from the *Durchmusterungen* (Bonner [Argelander 1859-62, Küstner 1903], *Southern* [Schönfeld 1886], *Córdoba* [Thome 1892-1932], or *Cape Photographic* [Gill and Kapteyn 1895-1900]), the HD, and the WDS. The file is ordered north to south by DM zone and in increasing right ascension within each zone. DM catalogs are identified by their two-letter abbreviations.

Byte(s)	Fortran Format	Data
1-2	A2	DM identifier (BD, SD, CD, CP)
3-5	I3 (A3)	DM zone
6	1X	Blank
7-11	I5 (A5)	DM number
12-14	3X	Blank
15-20	I6 (A6)	HD number
21-22	A2	HD suffix
23	1X	Blank
24-33	A10	WDS designation

Table 7. DM-HD-WDS Cross Index Format

2.9 *SAO-HD-WDS Cross Index (File 8 of 11)*

This file is a cross index of identifications from the *Smithsonian Astrophysical Observatory Star Catalog* (SAO Staff 1966), the HD, and the WDS. It is ordered by SAO number.

Byte(s)	Fortran Format	Data
1-6	I6	SAO number
7	1X	Blank
8-13	I6 (A6)	HD number
14-15	A2	HD suffix
16	1X	Blank
17-26	A10	WDS designation

Table 8. SAO-HD-WDS Cross Index Format

2.10 *ADS-HD-WDS Cross Index (File 9 of 11)*

This file is a cross index of identifications from the Aitken double-star catalog (ADS, Aitken 1932), the HD, and the WDS. It is ordered by increasing ADS number. In this and subsequent cross-index tables, the HD suffix occupies three bytes instead of two to accommodate one case where the HD numbers of two stars in a binary system are not consecutive (see item 4 in Section 3.1).

Byte(s)	Fortran Format	Data
1-5	I5	ADS number
6	1X	Blank
7-12	I6 (A6)	HD number
13-15	A3	HD suffix
16-25	A10	WDS designation

Table 9. ADS-HD-WDS Cross Index Format

2.11 Constellation-HD-WDS Cross Index (File 10 of 11)

The file contains a cross index of commonly used star names (constellation identifiers) and their HD and WDS equivalents. Constellation designations include Greek letters (Bayer designations) and Arabic numerals (Flamsteed numbers), with the Bayer designation taking priority (most bright northern stars have both). Variable-star names are also included. The file is ordered by constellation abbreviation and by Greek letter and Flamsteed number order within each constellation.

Byte(s)	Fortran Format	Data
1-9	A9	Star name
10	1X	Blank
11-13	A3	Constellation abbreviation
14	1X	Blank
15-20	I6 (A6)	HD number
21-23	A3	HD suffix
24-33	A10	WDS designation

Table 10. Constellation-HD-WDS Cross Index Format

2.12 Discoverer-HD-WDS Cross Index (File 11 of 11)

This file cross indexes the HD and WDS identifiers with discoverer designations, including various multiple-star identifiers, names from miscellaneous observers' lists, CHARA discovery numbers, etc. Most of these identifications can be found in the *First Dictionary of the Nomenclature of Celestial Objects* or its *Supplement* (Fernandez, Lortet, and Spite 1983; Lortet and Spite 1986).

Byte(s)	Fortran Format	Data
1-13	A13	Miscellaneous identifier
14	1X	Blank
15-20	I6 (A6)	HD number
21-23	A3	HD suffix
24-33	A10	WDS designation

Table 11. Discoverer-HD-WDS Cross Index Format

3.0 History

3.1 Remarks and Modifications

The machine-readable version of the *Second Catalog of Interferometric Measurements of Binary Stars* was received on magnetic tape from Drs. H. A. McAlister and W. I. Hartkopf of Georgia State University on November 8, 1988. Since the tape was in an ANSI labeled multifile format, the individual files were loaded onto the VAX 8650 computer of the National Space Science Data Center, then transferred via a local area network to the IBM 3081K machine of the NASA Space and Earth Sciences Computing Center at Goddard Space Flight Center, where the ADC archive is located, and where the expanded memory and powerful editing facilities of the IBM computer could be employed.

Following completion of the work on the previous edition of the catalog (McAlister and Hartkopf 1985), which was received as a single text file formatted for printing, close collaboration between the ADC and Dr. Hartkopf resulted in a list of suggestions for the structuring and formatting of the second (present) edition. Dr. Hartkopf followed these suggestions and produced the new catalog in a format that was very easy to work with and to prepare for distribution. The following minor modifications were made to the files indicated in order to make them easier to process by machine and to facilitate the use of the cross indexes:

1. Certain fields in the data file contained hyphens as fill characters where data were missing. These were replaced with blanks.
2. Durchmusterung identifier abbreviations (BD, SD, CD, CP) were added to the DM designations in the DM cross index file. This addition is important in the southern hemisphere, where CD and CP stars are mixed and it is laborious to identify the correct DM catalog without the abbreviations.
3. Blank records between constellation groups in the constellation cross index were removed in order that the file can be sorted properly by any identifier present, and to decrease storage.
4. There is one system (65 UMa) in some of the cross-index tables where the adjacent HD suffix notation does not work. This is because the bright components of 65 UMa are designated HD 103483 and HD 103498. Where these components were designated as a single entry in a cross indexed catalog, the higher designation was omitted. By using the notation "/98" as the HD suffix in the ADS, constellation, and discoverer cross indexes, it was possible to include the second designation in those tables.

4.0 Acknowledgments and References

4.1 Acknowledgments

Appreciation is expressed to Drs. Hal McAlister and Bill Hartkopf for supplying the magnetic tape of the *Second Catalog of Interferometric Measurements of Binary Stars*. Dr. Hartkopf supplied annotated sample listings of the files and prepared the second edition of the catalog with great care. His work is sincerely appreciated because it saved the ADC a great amount of time in preparing the final catalog for archiving and dissemination. Drs. McAlister and Hartkopf also kindly reviewed a draft copy of this document and responded with their comments in a timely manner.

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Appendix A. Sample Listing

The sample listing given on the following pages shows logical records exactly as they are recorded in the machine-readable version of the catalog. Groups of records from the beginning and end of each file are illustrated. The beginning of each record and the bytes within the record are indicated by the column heading index across the top of each page (digits read vertically).

LISTING OF RECORDS FROM DATA FILE

Data File Name: Int. Meas. Bin., Intro.

Records 1 To 20

Data File 50

Record Length 80 bytes

Input VOLSER ADC006

C O L U M N
H E A D I N G
I N D E X

111111111122222222223333333333444444444455555555556666666666777777777788888888889999999999000000000111111
123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345

- Record 1 SECOND CATALOG OF INTERFEROMETRIC MEASUREMENTS OF BINARY STARS
- Record 2 Harold A. Mollister and William I. Hartkopf
- Record 3 Center for High Angular Resolution Astronomy
- Record 4 Georgia State University
- Record 5 Atlanta, Georgia 30303 U.S.A.
- Record 6 CHARA Contribution No. 2
- Record 7 October 1988
- Record 8 I. INTRODUCTION
- Record 9 This catalog presents all "modern" interferometric measurements of binary
- Record 10 stars known to the compilers to be in print or in press before the end of
- Record 11 September 1988. As with the First Catalog (CHARA Contribution No. 1, issued
- Record 12 in January 1984), we also include only the visual interferometry results from
- Record 13 the pioneering efforts on Mt. Wilson of Anderson and Merrill. The technique of
- Record 14 speckle interferometry has contributed the great majority of the catalog
- Record 15 material, and speckle methods are now well established. Most measurements have
- Record 16 been made at large aperture telescopes by groups in France, the Soviet Union,
- Record 17 and the United States. Also of promising potential are programs of binary star
- Record 18 interferometry carried out at telescopes of moderate and even small aperture.
- Record 19 Measurements from the southern hemisphere continue to be rare, an irony when
- Record 20 one considers the decades of productive measurements of southern visual

21

LISTING OF RECORDS FROM DATA FILE

Data File Name: Int. Meas. Bin., Notes

Records 1 To 20

Data File 53

Record Length 80 bytes

Input VOLSER ADC006

C O L U M N
H E A D I N G
I N D E X

11111111112222222222333333333344444455555556666667777777888888899999900000000111111
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345

- Record 1 Notes to the Second Catalog of Interferometric Measurements of Binary Stars
- Record 2 (Notes from other papers are followed by the paper code in parentheses.)
- Record 3
- Record 4 00122+5337 = ADS 148
- Record 5 1976.885 The quoted value of rho is a vector separation along the given
- Record 6 position angle.
- Record 7
- Record 8 00173+0852 = ADS 238
- Record 9 ----- The measure reported in A6 for 1976.6220 is spurious and has
- Record 10 been deleted from this catalog.
- Record 11 1985.745 Large and irregular residuals preclude the correction of an
- Record 12 orbit. (R16)
- Record 13
- Record 14 00283-2020 = HR 108
- Record 15 1979.7730 This measure was omitted in A7.
- Record 16 1982.7657 This autocorrelation was remeasured; the new results are listed
- Record 17 here.
- Record 18
- Record 19 00352-0336 = ADS 490
- Record 20 1979.5326 This measure was incorrectly attributed to ADS 2200 in A7.

LISTING OF RECORDS FROM DATA FILE

Data File Name: Int. Meas. Bin., Refs

Records 1 To 20

Data File 54

Record Length 80 bytes

Input VOLSER ADC006

C O L U M N

H E A D I N G

I N D E X

11111111112222222222333333333344444444555555555566666666777777777788888888889999999999000000000111111
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345

TABLE II. Bibliographic References

Record	1	A1	- McAllister, H.A. 1977, Astrophys. J. 215, 159.
Record	2	A2	- McAllister, H.A. 1978, Astrophys. J. 225, 932.
Record	3	A3	- McAllister, H.A. and DeGioia, K.A. 1979, Astrophys. J. 228, 493.
Record	4	A4	- McAllister, H.A. 1979, Astrophys. J. 230, 497.
Record	5	A5	- McAllister, H.A. and Fekel, F.C. 1980, Astrophys. J. Suppl. 43, 327.
Record	6	A6	- McAllister, H.A. and Hendry, E.M. 1982, Astrophys. J. Suppl. 48, 273.
Record	7	A7	- McAllister, H.A. and Hendry, E.M. 1982, Astrophys. J. Suppl. 49, 267.
Record	8	A8	- McAllister, H.A., Hendry, E.M., Hartkopf, W.I., Campbell, B.G., and Fekel, F.C. 1983, Astrophys. J. Suppl. 51, 309.
Record	9	A9	- McAllister, H.A., Hartkopf, W.I., Hendry, E.M., Gaston, B.J., and Fekel, F.C. 1984, Astrophys. J. Suppl. 54, 251.
Record	10	A10	- McAllister, H.A. and Hartkopf, W.I. 1984, Catalog of Interferometric Measurements of Binary Stars, CHARA Contribution No. 1 (previously unpublished KPMO 2.1-m observations).
Record	11	A11	- McAllister, H.A. 1978, Astrophys. J. 223, 526.
Record	12	B1	- Morgan, B.L., Beddoes, D.R., Scaddan, R.J. and Dainty, J.C. 1978, M.N.R.A.S. 183, 701.

LISTING OF RECORDS FROM DATA FILE

Data File Name: Int. Meas. Bin., Refs

Records 100 To 119

Data File 54

Record Length 80 bytes

Input VOLSER ADC006

COLUMN
HEAD
INDEX

1111111111222222222233333333334444445555555555666666777777777788888888889999999999000000000111111
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345

Record	100	R12 = Tokovinin, A.A. 1985, Astron. Astrophys. Suppl. 61, 483.
Record	101	R13 = Dudinov, V.M., Kuz'menkov, S.G., Konichek, V.V., Tsvetkova, V.S., Rylov, V.S., and Erokhin, V.M. 1986, Soviet Astron. 30, 359.
Record	102	R14 = Balega, Yu.Yu. 1988, private communication.
Record	103	R15 = Balega, I.I. and Balega, Yu.Yu. 1987, Soviet Astron. Lett. 13, no. 3.
Record	104	R16 = Tokovinin, A.A. and Ismailov, R.M. 1988, Astron. Astrophys. Suppl. 72, 563.
Record	105	
Record	106	
Record	107	
Record	108	S1 = Schmidt, G.D., Angel, J.R.P., and Harms, R. 1977, Pub. A.S.P. 89, 410.
Record	109	S2 = Cocke, W.J., Hege, E.K., Hubbard, E.M., Strittmatter, P.A., and Worden, S.P. 1981, I.A.U. Colloquium No. 62: Current Techniques in Double and Multiple Star Research, R.S. Harrington and O.G. Franz, eds. Lowell Observatory Bulletin No. 167, Vol. 9, No. 1, p. 159.
Record	110	
Record	111	
Record	112	
Record	113	S3 = Hege, E.K., Hubbard, E.M., Cocke, W.J., Strittmatter, P.A., Worden, S.P., and Radick, R.R. 1981, I.A.U. Colloquium No. 62: Current Techniques in Double and Multiple Star Research, R.S. Harrington and O.G. Franz, eds. Lowell Observatory Bulletin No. 167, Vol. 9, No. 1, p. 185.
Record	114	
Record	115	
Record	116	
Record	117	
Record	118	M1 = Anderson, J.A. 1920, Astrophys. J. 51, 263.
Record	119	M2 = Merrill, P.W. 1922, Astrophys. J. 56, 43.

LISTING OF RECORDS FROM DATA FILE

Data File Name: Int. Meas. Bin., SAO CI

Records 1 To 20

Data File 57

Record Length 26 bytes

Input VOLSER ADC006

C O L U M N

H E A D I N G

I N D E X

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123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345

Record	1	22	245	00085+8647
Record	2	171	5621	01037+8436
Record	3	308	8890	02316+8916
Record	4	550	20084	03323+8455
Record	5	650	25007-8	04101+8042
Record	6	1701	89571	10297+8415
Record	7	1714	90089	10311+8234
Record	8	1735	91075	10360+8030
Record	9	2459	133002	14503+8231
Record	10	2559	140625	15254+8431
Record	11	2975	167101	17530+8354
Record	12	3243	187216	19243+8522
Record	13	3294	191079	19418+8552
Record	14	3694	210979	22062+8240
Record	15	3769	215319	22394+8123
Record	16	3830	217992	23013+8046
Record	17	4048	431	00091+7943
Record	18	4071	1141	00163+7657
Record	19	4079	1360	00182+7256
Record	20	4127	2520	00300+7515

LISTING OF RECORDS FROM DATA FILE

Data File Name: Int. Meas. Bin., ADS CI

Records 1 To 20

Data File 58

Record Length 25 bytes

Input VOLSER ADC006

C O L U M N

H E A D I N G

I N D E X

1111111111222222222233333333334444445555555555666666777777777788888888889999999999000000000111111
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345

Record	1	30	225218	00046+4206
Record	2	32	225220	00046+3416
Record	3	42	225276	00049+2639
Record	4	46	3	00052+4514
Record	5	61	123	00062+5826
Record	6	69	166	00066+2901
Record	7	94	358	00084+2905
Record	8	102	431	00091+7943
Record	9	107	432	00092+5909
Record	10	122	560	00100+1109
Record	11	124	570	00104+5831
Record	12	143	709	00116+5558
Record	13	147	744	00119+2825
Record	14	148	761	00122+5337
Record	15	161	895	00134+2659
Record	16	191	1061	00150+0849
Record	17	197	1082	00152+4406
Record	18	207	1141	00163+7657
Record	19	215	1185	00164+4336
Record	20	222	1239	00170+6132

CHITLADIXING

Records 857 To 876

Data File 59

Record Length 33 bytes

Input VOLSER ADC006

CHITLADIXING

[illegible]

Record	857	73	V1x	117661	13320-1844
Record	858	96	V1x	123630	14090-1020
Record	859	109	V1x	130109	14462+0154
Record	860	CS	V1x	125248	14186-1843
Record	861	DL	V1x	120901	13526-1843
Record	862	Alpha	Vu1	183439	19286+2439
Record	863	5	Vu1	182919	19262+2006
Record	864	13	Vu1	188260	19534+2405
Record	865	15	Vu1	189849	20011+2745
Record	866	16	Vu1	190004	20018+2456
Record	867	17	Vu1	190993	20069+2337
Record	868	18	Vu1	191747	20106+2654
Record	869	20	Vu1	192044	20120+2629
Record	870	21	Vu1	192518	20142+2842
Record	871	23	Vu1	192806	20158+2749
Record	872	24	Vu1	192944	20168+2440
Record	873	27	Vu1	196504	20371+2628
Record	874	30	Vu1	197752	20449+2516
Record	875	35	Vu1	204414	21277+2737
Record	876	BM	Vu1	199140	20544+2831

